

Data Acquisition Systems

In the mid-1980s, Kinetic Systems Corporation, Lockport, Illinois teamed with Langley Research Center on a joint study and development program. The study involved feasibility determination of using high speed CAMAC (Computer Automated Measurement and Control) data acquisition systems in Langley's Advanced Real Time Simulation (ARTS) system, which supports flight simulation R&D in such areas as automated control, navigation and guidance, air combat, and workload analysis for pilots and astronauts.

The study found that CAMAC equipment could significantly improve the ARTS system by allowing 32 high performance simulators located throughout the Langley complex to be controlled by centrally-located host computers. With Langley input, Kinetic Systems proceeded to develop the requisite hardware, such as an advanced performance fiber optic data highway and a series of digital to analog, analog to digital, and digital to synchro converter modules. The technology developed for ARTS broadened Kinetic Systems' technical capabilities and brought a number of commercial applications.

An example is the fusion research program conducted by General Atomics (GA), San Diego, California, the goal of which is to develop a commercial nuclear fusion reactor that can be operated safely and economically.

At the heart of this research is the DIII-D experimental tokamak (**below**), designed and built by GA and operated by the company under contract to the Department of

Energy. The tokamak is used to explore improvements in reactor grade fusion plasmas by magnetic shaping. A "shot" (a test plasma burst) lasts only five to 10 seconds but generates about 100 megabytes of data.

To handle an increasing flow of data, GA recently upgraded its computer system and in the process added an enhanced serial highway and associated components originally developed by Kinetic Systems for Langley's ARTS. The combination of GA's new computer system and the Kinetic Systems equipment allows GA to acquire tokamak data from four to 15 times more rapidly.

Another project that uses the technology developed for NASA is Ford Motor Company's transmission test cell program in Livonia, Michigan, where Ford tests auto transmissions for durability, performance and efficiency. Ford operates 24 test cells (**above**) that use sophisticated computer programs to control and monitor the tests; each cell also contains a Kinetic Systems CAMAC-based data acquisition and control system. That the relatively new test cells are performing successfully is evident in the fact that Ford is

installing an additional 24 cells at Livonia. For marketing its equipment to these and other customers, Kinetic Systems is engaged in cooperative marketing partnerships with Digital Equipment Corporation, Marlborough, Massachusetts and Hewlett-Packard Company, Cupertino, California.

